

delete "53" and insert -- 99 --.

63. (amended) A method according to claim [53] 99 wherein the catalyst is included as a component of the substrate resulting from mixing said catalyst in bulk with the material forming said substrate.

71. (twice amended) A method according to claim [53] 99 wherein the catalyst is stable in the presence of moisture and oxygen and can initiate polymerization of the metathesizable material upon contact at room temperature.

72. (amended) A method according to claim [55] 99 wherein the metathesizable material includes at least one reactive unsaturated functional group.

93. (amended) A method according to claim [53] 99 wherein step (b) further comprises contacting the substrate surface multiple times with the same or different metathesizable material, allowing a metathesis product to be formed each said time as a coating from contacting active sites on the product surface .

Please add the following claims:

99. A method for providing a coating on a substrate surface comprising: (a) providing a metathesis catalyst at the substrate surface; and

(b) contacting said catalyst on the substrate surface with a coating by printing, spraying, dipping, brushing, wiping, or roll coating of a material that undergoes a metathesis reaction, and (c) forming a coating on said substrate surface from the product of said metathesis reaction.

100. The method of claim 99 wherein said metathesizable material is a component of a paint.

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101. The method of claim 99 wherein said contacting of said catalyst is by printing wherein said printing is on predetermined selected areas on said substrate.

102. The method of claim 99 wherein said catalyst is spray-applied, and said metathesizable material is spray-applied.

103. The method of claim 102 wherein said catalyst and said metathesizable material are spray-applied simultaneously.

104. A method for providing a coating on the outermost portion of a substrate, said coating is uniform, conforming to the outermost surface of said substrate, said method comprising:

(a) providing a metathesis catalyst at the substrate surface; and contacting the catalyst on the substrate surface with a material that undergoes a metathesis reaction to form a coating of the product of said metathesis reaction on said substrate.

105. A method according to claim 104 wherein the coating is formed directly on the substrate surface.

106. A method according to claim 99 wherein the coating has a thickness that is less than the thickness of the substrate.

107. A method according to claim 104 wherein the coating has a thickness that is less than the thickness of the substrate.

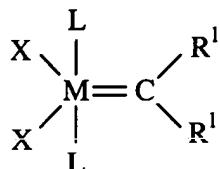
108. A method according to claim 104 wherein the substrate comprises a substantially cured elastomeric material.

109. A method according to claim 108 wherein the elastomeric material is a thermoplastic elastomer.

110. A method according to claim 104 wherein step (b) occurs at room temperature.
111. A method according to claim 104 wherein steps (a)-(b) occur at room temperature.
112. A method according to claim 104 wherein step (a) comprises applying a catalyst onto the substrate surface.
113. A method according to claim 112 wherein the catalyst is dissolved or mixed into a liquid carrier fluid.
114. A method according to claim 112 wherein the catalyst is included as a component in a multi-component composition.
115. A method according to claim 104 wherein the catalyst is included as a component of the substrate resulting from mixing said catalyst in bulk with the material forming said substrate.
116. A method according to claim 108 wherein the elastomeric material is selected from natural rubber, polychloroprene, polybutadiene, polyisoprene, styrene-butadiene copolymer rubber, acrylonitrile-butadiene copolymer rubber, ethylene-propylene copolymer rubber, ethylene-propylene-diene terpolymer rubber, butyl rubber, brominated butyl rubber, alkylated chlorosulfonated polyethylene rubber, hydrogenated nitrile rubber, silicone rubber, fluorosilicone rubber, poly(n-butyl acrylate), thermoplastic elastomer and mixtures thereof.
117. A method according to claim 104 wherein the catalyst is selected from at least one of a rhenium compound, ruthenium compound, osmium compound, molybdenum compound, tungsten compound, titanium compound, niobium compound, iridium compound and MgCl₂.

118. A method according to claim 117 wherein the catalyst is selected from a ruthenium compound, a molybdenum compound, an iridium compound and an osmium compound.

119. A method according to claim 118 wherein the catalyst has a structure represented by



wherein M is Os, Ru or Ir; each R¹ is the same or different and is H, alkenyl, alkynyl, alkyl, aryl, alkaryl, aralkyl, carboxylate, alkoxy, alkenylalkoxy, alkenylaryl, alkynylalkoxy, aryloxy, alcoxycarbonyl, alkylthio, alkylsulfonyl or alkylsulfinyl; X is the same or different and is an anionic ligand group; and L is the same or different and is a neutral electron donor group.

120. A method according to claim 119 wherein X is Cl, Br, I, F, CN, SCN, or N₃; L is Q(R²)_a wherein Q is P, As, Sb or N; R² is H, cycloalkyl, alkyl, aryl, alkoxy, arylate or a heterocyclic ring; and a is 1, 2 or 3; M is Ru; and R¹ is H, phenyl, -CH=C(phenyl)₂, -CH=C(CH₃)₂ or -C(CH₃)₂(phenyl).

121. A method according to claim 120 wherein the catalyst is a phosphine-substituted ruthenium carbene.

122. A method according to claim 121 wherein the catalyst is bis(tricyclohexylphosphine)benzylidene ruthenium (IV) dichloride.

123. A method according to claim 104 wherein the catalyst is stable in the presence of moisture and oxygen and can initiate polymerization of the metathesizable material upon contact at room temperature.

124. A method according to claim 107 wherein the metathesizable material includes at least one reactive unsaturated functional group.

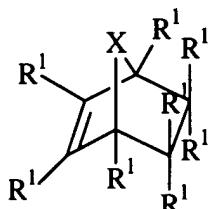
125. A method according to claim 124 wherein the metathesizable material comprises an olefin.

126. A method according to claim 125 wherein the metathesizable material is selected from ethene, α -alkene, acyclic alkene, acyclic diene, acetylene, cyclic alkene and cyclic polyene and mixtures thereof.

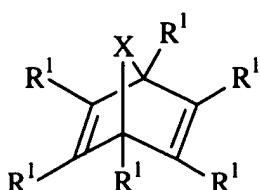
127. A method according to claim 104 wherein the metathesizable material comprises a cycloolefin.

128. A method according to claim 127 wherein the metathesizable material is a monomer or oligomer selected from norbornene, cycloalkene, cycloalkadiene, cycloalkatriene, cycloalkatetraene, aromatic-containing cycloolefin and mixtures thereof.

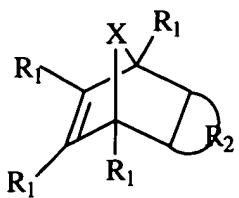
129. A method according to claim 128 wherein the metathesizable material comprises a norbornene having a structure represented by



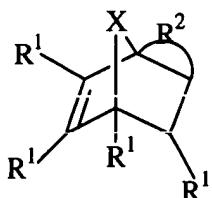
or



or



or



wherein X is CH₂, CHR³, C(R³)₂, O, S, N-R³, P-R³, O=P-R³, Si(R³)₂, B-R³ or As-R³; each R¹ is independently H, CH₂, alkyl, alkenyl, cycloalkyl, cycloalkenyl, aryl, alkaryl, aralkyl, halogen, halogenated alkyl, halogenated alkenyl, alkoxy, oxyalkyl, carboxyl, carbonyl, amido, (meth)acrylate-containing group, anhydride-containing group, thioalkoxy, sulfoxide, nitro, hydroxy, keto, carbamato, sulfonyl, sulfinyl, carboxylate, silanyl, cyano or imido; R² is a fused aromatic, aliphatic or heterocyclic or polycyclic ring; and R³ is alkyl, alkenyl, cycloalkyl, cycloalkenyl, aryl, alkaryl, aralkyl or alkoxy.

130. A method according to claim 129 wherein the metathesizable material comprises ethylenenorbornene monomer or oligomer.

131. A method according to claim 104 wherein the metathesizable material is in the form of a liquid.

132. A method according to claim 104 wherein the metathesizable material is a component of a multi-component composition.

133. A method according to claim 104 wherein the catalyst is applied in the form of

an aqueous solution or mixture and the metathesizable material is applied in the form of a liquid that is substantially 100 percent reactive.

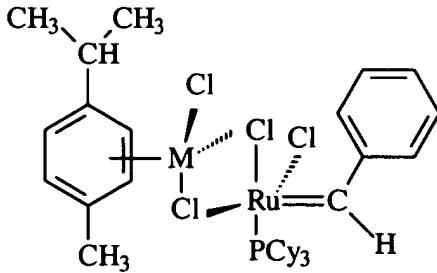
134. A method according to claim 104 wherein the method is substantially free of the use of volatile organic solvents.

135. A method according to claim 104 wherein step (a) comprises applying a ruthenium catalyst in a liquid carrier to the substrate surface and step (b) comprises applying a metathesizable liquid norbornene monomer to the catalyst-applied substrate surface.

136. A method according to claim 104 wherein step (b) further comprises contacting the substrate surface multiple times with the same or different metathesizable material, allowing a metathesis reaction to form a polymerized product each said time, resulting in a multi-layered coating.

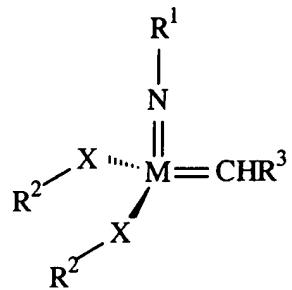
137. A method according to claim 136 wherein an active amount of catalyst remains on the substrate surface after each successive coating sufficient to polymerize the subsequent application of the metathesizable material.

138. A method according to claim 118 wherein the catalyst comprises a bimetallic catalyst having a structure represented by



wherein M is Ru, Os or Rh.

139. A method according to claim 118 wherein the catalyst has a structure represented by



wherein M is Mo or W; X is O or S; R¹ is an alkyl, aryl, aralkyl, alkaryl, haloalkyl, haloaryl, haloaralkyl, or a silicon-containing analog thereof; R² are each individually the same or different and are an alkyl, aryl, aralkyl, alkaryl, haloalkyl, haloaryl, haloaralkyl, or together form a heterocyclic or cycloalkyl ring; and R³ is alkyl, aryl, aralkyl or alkaryl.

140. The method of claim 104 wherein said metathesizable material is a component of a paint.

141. The method of claim 104 wherein said contacting of said catalyst is by printing wherein said printing is on predetermined selected areas on said substrate.

142. The method of claim 104 wherein said catalyst is spray-applied, and said metathesizable material is spray-applied.

143. The method of claim 142 wherein said catalyst and said metathesizable material are spray-applied simultaneously.

REMARKS ON AMENDMENTS

Support for the amendment of claim 63 where the catalyst is included as a component of the substrate characterized as resulting from mixing said catalyst in bulk with the material forming said substrate, is found on Page 18, line 17.

Claim 71 is amended to the form originally presented.

Support for amendment of claim 93, allowing the same or different metathesis product to be formed each time in a multilayered coating from contacting active sites on the product surface is found on page 5, lines 12.

Support for claim 100, where the metathesizable material is a component of a paint is found on page 4, line 2.

Support for claim 101 where the contacting of catalyst is by printing on predetermined selected areas of the substrate is found on page 20, line 24.

Support for claim 102 where the catalyst is spray-applied, and the metathesizable material is spray-applied is on page 20, line 25 and page 22, line 9, respectively.

Support for claim 103 where the catalyst and metathesizable material are spray-applied simultaneously is found on page 21, line 9.

Independent claims

Method Claim 53 was replaced by claim 99 in order to characterize the coating step by methods excluding Reaction Injection Molding. The methods are “printing, spraying, dipping, brushing, wiping, and roll coating of a material that undergoes a metathesis reaction to form a coating from the product of said reaction on the substrate. This is supported on page 22, lines 9-10. These coating methods are clearly distinguished from Reaction Injection Molding.

Independent claim 104 is added to particularly claim a method whereby a coating of

metathesizable material is made on the outermost portion of the substrate, and the coating is uniform, and necessarily conforms to the outermost surface of said substrate. This is supported in the specification on page 6, line 28, and page 46, line 15, illustrating a uniform coating of poly(ENB) as an example showed good adhesion to rubbery substrates. Applicants distinguish this coating from Reaction Injection Molding that forms an overlying polymerizate on fillers, e.g. fibers that must take the shape of the mold cavity, and not the shape of the substrate. Applicants maintained and now maintain that a coating, however formed from RIM, where a mold cavity entirely encompasses an amorphous, or shaped substrate, cannot form a "coating having a thickness less than the thickness of the substrate", as claimed in claims 106 and 107. To do so would mean that the mold cavity does not surround the charged substrate, which is inoperative under RIM. RIM processes do not result in coatings only on the outermost surface, but extend well beyond the surface to take the shape of the mold cavity, as one of ordinary skill would reason and know. However, the Office deemed the result of RIM could be termed a coating on a substrate and in the interest of moving the prosecution forward, clear-meaning terms are provided in independent claims 99 and 104, describing either a uniform coating that conforms to the outermost surface, or coating methods that explicitly exclude RIM. This coupled with the admission against interest that the claimed invention is not directed to RIM, such patentably distinguished effects on the claims are prayed for.

REJECTIONS

Sec. 112

1. Claims 53, 54, 56, 57, 59-83, 94, 96 and 98 were rejected under 35 USC 112 as indefinite. Claim 53 has been replaced by claim 99. The forming a coating now expressly provides that the coating with material that undergoes a metathesis reaction forms a coating from the product of said reaction on the substrate. This connection between the forming a coating to the contacting step is now explicitly made. This language is also incorporated into claim 104.

2. The dependency of claim 72 has been changed to depend from claim 99.

Sec. 102

Claims 53, 54, 59-63 and 71-82 were rejected under 35 USC 102(b) as unpatentable over EP 424,833. Applicants traverse the rejection based on the above remarks concerning independent claims 99 and 104. These claims now explicitly exclude a reaction injection process by way of the coating method, or the nature of the coating, respectively. Removal of the rejection is respectfully requested.

Sec. 103

Claims 67-71, 83, 96 and 98 were rejected under 35 USC 103(a) as unpatentable over EP 424,833. Applicants traverse the rejection, as it would apply to independent claims 99 and 104, on the grounds that EP is directed to RIM. With respect to claim 99, there is no teaching, suggestion, or motivation to do what applicants are claiming in forming a coating by printing, spraying, dipping, brushing, wiping, and roll coating of a material that undergoes a metathesis reaction to form a coating from the product of said reaction on the substrate. With respect to claim 104, there is no teaching, suggestion or motivation from EP 424,833 nor any enabling method known to adapt RIM to form a coating which is uniform and conforms to the outermost surface of the substrate. That is the antithesis of RIM where the coating, however termed by the Office must conform to the surface of the mold cavity. Coatings in accordance with Applicants invention do not form from a mold cavity and can only take the shape of the outline of the outermost portion of the substrate.

Sec. 103 over WO 97/38036 taken in view of EP 424,833

WO provides a mixing of catalyst with polymerizable material, and taken in light of EP 424,833, is seen to provide separate steps of treating substrate with catalyst,

and forming a RIM composition, which encapsulates the treated substrate.

Applicants point out above the distinctions of the coating itself, and the coating methods that define over the EP process, and note there is nothing taken from both references to suggest a method to make uniform coatings that conform to the outermost surface, nor a suggestion to replace the RIM process with another undisclosed process.

Reconsideration is respectfully requested.

Sincerely,



Miles B. Dearth

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